Computer - C.A.I. Program, Evaluation of Spring 1967
91A17-1-14-1

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EVALUATION

OF

THE C.A.I. PROGRAM

Spring 1967

COMPUTER ASSISTED INSTRUCTION

The Computer Assisted Instruction program originated at Stanford University in California. Supplementary to the regular classroom instruction, the program consists of drills and practice in arithmetic geared to the individual child's capabilities. Each child spends about five minutes each day at the machine. When the lesson is completed, the machine prints out information for each student which includes the number of correct answers, the percentage of correct answers, the total errors, a list of questions answered incorrectly and the total amount of time used. It them types "Good-by, Janie . . . Please tear off on the dotted line", and turns the paper up to the cutter bar permitting the student to tear off and keep the printed record of his day's work. The computer then gives the teacher the number and the nature of the errors the children and other information that will help her in her work. From this the teacher can discuss with individual students the errors in their "print outs" and modify her instruction to handle problems of general concern to the class.

The CAI Center is located in the University Breckinridge School on the Morehead State University Campus in Morehead, Kentucky. There are presently 28 terminals in the computer center. Rowan County and Elliottville are also involved in this program, each having one terminal in their school system.

In the fall (1967-68) the program will be expanded in Eastern Kentucky to include seven more counties.

E N R O L L M E N T

SPRING 1967

University Breckinridge School

Grade	Number
1	28
2	32
3	30
4	28
5	32
6	0
7	29
8	0

MY FIRST DAY ON THE COMPUTER

I felt scared when I first started on the computer. I'm glad we were picked to use it. I'm glad we get to use it till the last of the year. I told my mother about it. It is funny how it writes your name by itself. At first I didn't do it too well. Now I'm getting better. The letters and numbers are easier to find now. With more practice I think I can do better. I feel happy about the computer. I'm glad the other grades don't get to use it, because if they did we wouldn't get to very much.

THE FUNNY COMPUTER

When I went into the office I saw Reba using the computer. I was not a bit scared--just a little. I got a good grade. I like when it talks to you. I told my parents about it and they said it was a wonderful thing.

THE FIRST TIME I USED A COMPUTER

I was surprised to see a computer in our school. I sure do thank those who helped us get it.

When I went into use it I was a little scared. But often I watched some other people. I understood it and I like it very much now.

THE NEW COMPUTER

There is a new computer in our school. When I first used it I was so scared. Now I'm so used to it. The computer must have a brain or something. When I went in the office the second time, I was not scared. I just have to do the problems on the computer. It is really funny. Those problems come from California.

I WAS SCARED OF THE COMPUTER

I was scared of the computer at first. I was afraid to push the button on it, because I thought that I would miss it. I didn't know how to work the problems at first. I like to do the things real well now. It looked funny to me, because you add the numbers in ones column first, but in the across problems you put tens column before the ones column. This is a very nice thing to do.

The following are evaluations from students and teachers at the University Breckinridge School. They were written during the Spring semester, 1967.

First Grade

Comments from First Grade children about the computer

1. A good machine
2. It types numbers, etc. fast.
3. Knows my name
4. Helps us learn to work faster
5. Helps us learn to keep our eyes on something
6. The time is too short.
7. It is too noisy.
8. Wish it would not break down
9. Wish we did something different on it
10. Typing too little

Comments from Teacher

1. Motivates child to be alert and to put forth greater effort
2. Timing of answer has made some of the immature children slightly nervous .
3. Increase in speed has been at the expense of accuracy for a few children.
4. Possibly a few revisions in the course as outlined in the book would help make it fit in with the other arithmetic work for the grade.

Second Grade

Comments from Second Grade children about the computer

1. It was kind of exciting.
2. I like the computer.
3. I felt kind of scared.
4. It was exciting and it was very fun, too.
5. And when I missed the second I was sadder.
6. I was nervous.
7. I was surprised at first, then when I went home, I was excited.
8. When I told mother and daddy, they excited, too.
9. I felt nervous but I was happy to work with the machine. It was wonderful.
10. I loved the computer.
11. I like the computer.
12. I hope the machine will work again soon.
13. The machine is wonderful.

Comments from the teacher

1. The uniqueness of working on a computer has motivated most of the group highly.
2. Several children have shown signs of becoming quite nervous, and this has affected their achievement adversely.
3. The fact that each child uses the computer only once a week tends to lessen the effectiveness of the practice session.

Fourth Grade

Comments from Fourth Grade children about the computer

1. It is fun and easy.
2. The machine makes me nervous.
3. If they ever get that machine fixed so it will not break down and get our class organized, it will save a lot of time and we can do much more arithmetic because we don't have the example.
4. I don't like for people to watch me.

Comments from Teacher

The fourth grade children have not participated enough on the computer to make a statement in regards to progress or to notice any carry over in the regular arithmetic class.

I think the drills are easy enough, but can't understand why the children who have been scoring high in the classroom arithmetic are constantly low and those less capable are usually higher than in regular class work.

Sixth Grade

Comments about the computer

At first, they were excited and pleased to have the opportunity to use a machine. They anxiously waited their turns and were unwilling to miss a time. The only complaint has been that observers and so many people around made them nervous. Susan Smith and Jan Grote chew their nails more than ever on computer days.

Now, the children say they are getting used to the computer and "it's just so-so". They are not as concerned about making 100% every time now. They still object to people standing around.

Many of the parents are interested in hearing about the computer. They want to know what it is really teaching. They are pleased that their children have the opportunity of doing something so new. Many have expressed a wish to see how the computer is used.

There seems to be at least some carry-over in a desire on the children's part to get correct answers in all arithmetic lessons. The slow starting students must get busy at once and concentrate on the computer. I am hoping in time, that better work habits will result. While it is still too early to see results, the children do see the need for practice and drill in arithmetic skills.

From my viewpoint, the motivation for drill is perhaps the most important result of working with the computer.

VISIT TO ELLIOTTVILLE: A RESUMÉ

A fourth grade class in Elliottville, Kentucky, has been learning arithmetic from a computer located in Palo Alto, California. Practice drills are received by a teletype machine, and the student simply types in his answers in the spaces provided. The computer scores the answers and instantly relays the results to the child awaiting at the teletype.

Dr. Morris Norfleet, Director of Research and Program Development at Morehead State University, Morehead, Kentucky, paid a visit to Elliottville Grade School on May 19, 1967, to discover the reactions of the students to the computer. Nothing but approval of the new program was to be found.

Children whom the teacher had once found inattentive are now to be seen with their eyes glued to the teletype before them. At times, the concentration may become so intense that the student may "talk" to the teletype machine. For instance, one boy, in a moment of frustration, called it an "old goose" after he had given several incorrect answers.

Not only do the children enjoy working problems on the teletype, but also their teacher, Mrs. James, reports that all students have shown a marked improvement in their basic understanding of arithmetic. Also, she notes that many of the slower students gain confidence by learning to operate a teletype.

However, the impact of computer arithmetic extends further that its immediate effect on the children. The introduction of this new method of instruction has aroused the interest of the parents also. Dr. Norfleet found that the parents of at least one of the fourth grade students displayed their son's papers on the wall of their home. Many other families had certain places in the home where the papers were stored after being read by the parents. Nearly all of the parents had shown more of an interest in their child's schoolwork since the use of the computer began, and several had visited the school to see the teletype in operation.

Before the visit ended, Dr. Norfleet had arranged with Elliottville Principal, Fenton Morris for an evening demonstration on the use of the teletype for the benefit of the parents of the fourth grade students and other interested persons within the Elliottville area. The demonstration was given at 7:00 p.m. the following Tuesday with approximately thirty people (parents and children) attending.

At that meeting, Dr. Norfleet delivered a brief talk on how the computer assisted method of instruction operates, and then gave several of the parents a turn at the teletype itself. Later, he showed color slides of his visit to Palo Alto, California, where the computer programming originates, and his own ideas of the future expanded use of such instructional techniques.

The parents' response to all of this was much more than encouraging. They unhesitatingly agreed that the exhuberance shown by the children in the new program had led to an increase in the interest that they (the parents) had in their children's school work.

If the parents' unequivocal approval of the new method of teaching is any indication, this demonstration meeting was a complete success.

The children themselves best sum up the way they feel about the new method of instruction. When Dr. Norfleet asked them whether or not they would approve of his removing the teletype, the answer was a spontaneous, unanimous, resounding "No."

ELLIOTTVILLE SCHOOL

GRADE 4

(Irene James)

ARITHMETIC SCORES

(These scores were based on the Stanford Achievement Test, Intermediate I Level, Form Y.)

SUMMARY

The beginning scores were obtained from the tests given on April 17, 1967, for all students except Clinton Barnette and Dorothy Stidham. These two students took their test on May 11, 1967. The grade placement for all students was 4.8.

The ending scores were obtained from tests given to all the students on May 25, 1967. Grade placement was 4.9.

The beginning class average in arithmetic was 3.9. The ending class average was about 4.6. Thus, there was an over all increase of approximately .7 or 7 months.

Name of Student	Arith. Comp.	Arith. Con.	Arith. App.	Average Score	Difference in Score
1. Barnette, H. Clinton, Jr.	3.5	4.3	3.2	3.7	
	3.5	4.3	3.2	3.7	0
2. Black, Michael Allen	2.9	3.0	3.2	3.1	
	3.5	4.0	3.8	3.8	+ .7
3. Bowman, Recis Dale	3.5	3.0	4.0	3.5	
	4.0	3.3	2.9	3.4	- .1
4. Buckler, Billy	2.9	2.1	2.9	2.6	
	4.1	2.7	3.0	3.3	+ .7
5. Caudill, Jerry E.	4.0	3.0	4.1	3.7	
	4.6	4.3	3.6	4.2	+ .5
6. Crisp, Brenda Kay	2.9	3.6	3.2	3.2	
	3.3	4.0	3.6	3.6	+ .4
7. Crockett, Jeanetta	5.2	4.5	5.8	5.2	
	6.2	6.3	6.5	6.3	+ 1.1
8. Day, Pamela Ann	4.1	2.3	2.7	3.0	
	5.0	4.5	4.4	4.6	+ 1.6
9. Dillon, Curtis	3.1	2.5	3.2	2.9	
	4.4	3.6	3.8	3.9	+ 1.0
10. Howard, David L.	5.3	4.5	4.2	4.7	
	5.9	7.1	6.5	6.5	+ 1.8
11. Ison, Lillie Mae	5.6	4.6	4.1	4.8	
	5.6	5.5	4.2	5.1	+ .3
12. Jent, Robert Lee	3.1	2.1	3.4	2.9	
	4.4	4.3	3.8	4.2	+ 1.3
13. Kidd, Edward	4.6	3.6	5.8	4.7	
	5.6	6.3	4.6	5.5	+ .8
14. Kidd, Reba Faye	5.8	5.2	4.7	5.2	
	6.4	6.1	4.9	5.8	+ .6
15. Kissinger, Sharon	5.0	4.3	4.1	4.5	
	6.4	5.2	6.1	5.9	+ 1.4
16. Lewis, Aileen	4.9	4.5	3.8	4.4	
	5.5	5.5	4.7	4.9	+ .5
17. Morris, Susie	4.0	3.3	3.2	3.5	
	4.3	3.6	3.0	3.7	+ .2
18. Riddle, William	3.5	2.7	3.2	2.9	
	4.4	2.7	2.7	3.3	+ .4
19. Royse, Emil Ray	2.8	4.0	3.0	3.2	
	3.1	4.0	2.7	3.3	+ .1

20.	Salmons, L. J.	2.7	3.6	2.9	3.1		
		2.9	3.6	2.5	3.0	-	.1
21.	Sloan, Barbara	4.9	5.2	7.5	5.9		
		5.6	5.2	5.8	5.5	-	.4
22.	Sloan, Leonard	2.9	3.3	3.4	3.2		
		4.3	2.3	4.0	3.5	+	.3
23.	Sloan, Randell	3.3	2.5	3.0	2.9		
		5.0	4.3	3.8	4.4	+	1.5
24.	Stidham, Dorothy	6.2	7.3	5.4	6.3		
		6.2	7.3	7.5	7.0	+	.7
25.	Thomas, Merry Kay	4.9	4.5	4.7	4.7		
		5.6	4.5	5.4	5.2	+	.5
26.	Trent, Debbie	3.6	3.0	2.5	3.0		
		3.8	2.5	3.2	3.2	+	.2
27.	Trent, Della	4.9	3.6	4.1	4.2		
		5.6	6.1	4.6	5.4	+	1.2
28.	Trent, Glennis	3.5	3.3	2.5	3.1		
		4.4	3.6	3.8	3.9	+	.8
29.	Winkleman, James	6.2	5.5	5.1	5.6		
		6.7	6.3	6.1	6.4	+	.8

NEWS
GENERAL TELEPHONE & ELECTRONICS

From Thomas E. McCarthy, Manager of Public Information

Release Date:

FOR IMMEDIATE RELEASE (3-14-67)

SUMMARY: California computer "talks" to Kentucky schoolchildren as arithmetic course over long-distance data communications facilities is inaugurated.

-- SIDEBAR --

MOREHEAD, Ky., March 14 -- "Goodbye Susan," said the computer.

Susan is a sixth-grade student at the University Breckinridge School in this Kentucky community, and the computer is located at Stanford University in Palo Alto, Calif. The child had completed successfully an arithmetic test given by the pre-programmed computer over long-distance data communications facilities.

More than 50 students from the school's second and sixth grades received instructions and tests in arithmetic from the computer during the formal inauguration of the computerized course this morning. Data communications equipment and circuits for the teaching program were installed at the Breckinridge School by General Telephone Company of Kentucky, a subsidiary of General Telephone & Electronics Corporation.

- MORE -

Students Receive Individual Instruction

The students sat in turn at one of three teletypewriter units which typed the arithmetic lesson for each individual as it was received over conventional telephone lines.

As each student took his or her turn, the teletypewriter printed out "please type your class number and first name." If the student spelled his name incorrectly, he was notified by the computer-controlled machine "name not listed, try again. Please type your number and name." Another incorrect spelling by the student prompted this message: "nope, try again."

When the student typed his class number and first name correctly, the teletypewriter responded with the child's correct last name. The student acknowledged its receipt by hitting the "space bar" on the machine, and the lesson began.

Computer: "Wrong, Try Again"

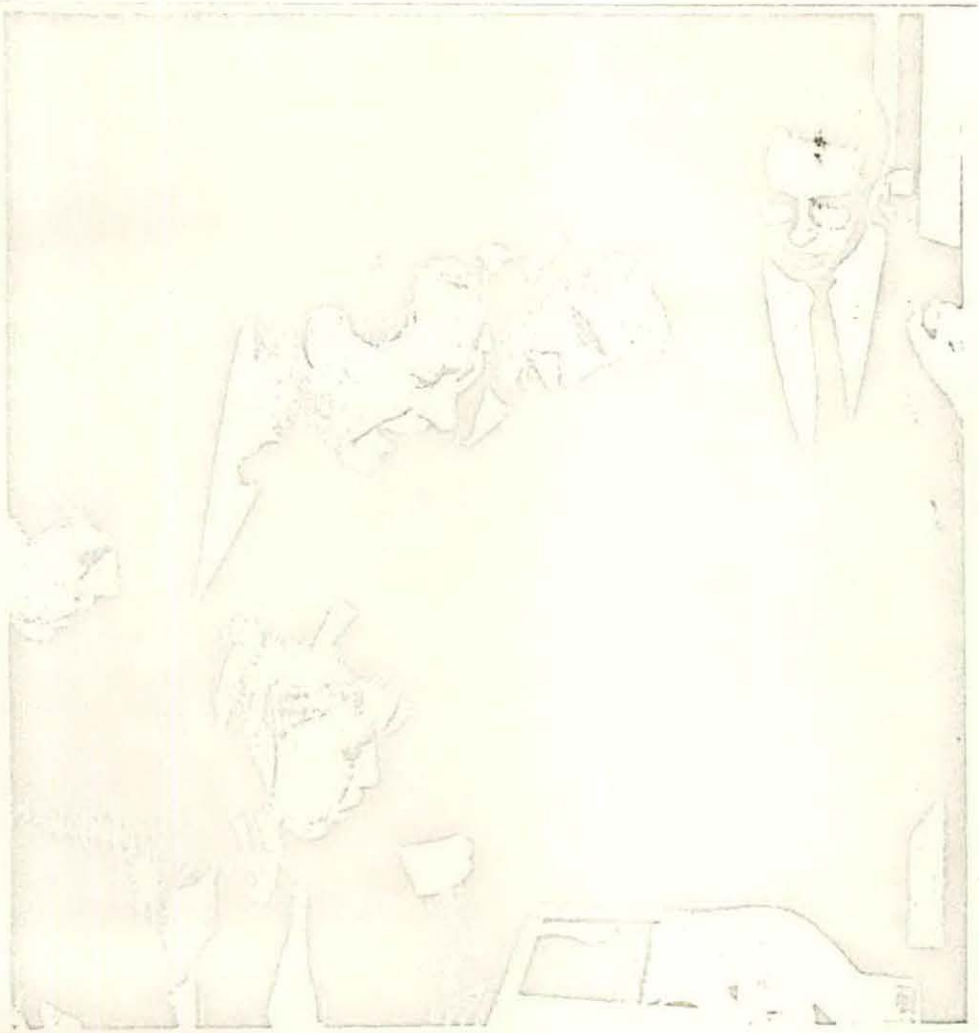
The Stanford computer is programmed to respond when a student's answer is properly placed in a pre-determined blank space. If the student answers the problem correctly, the next problem appears. When the student answers incorrectly, the teletypewriter types out the words "wrong, try again," and the problem itself is repeated. A second error on the same problem is followed by the message "wrong, the answer is ... ," and the correct answer is displayed.

The problem itself is then given once more to permit the student to write in the correct answer. An error at this point by the student causes the previous message to reappear; the question is repeated, and the child fills in the correct answer. The next problem is then presented.

A time limit is set for each question. If an answer is not given in 10 seconds, the machine then goes through the procedure followed when an error is made, except that the words "time is up" are substituted for "wrong" at each step.

When the lesson is completed, the teletypewriter prints out information for each student, including the number of correct answers, the percentage of correct answers, total errors, a list of the questions answered incorrectly, and the total amount of time consumed. Following this message, the machine types "goodbye Susan (or Jane or Jim), tear off here ...". It then turns the paper up to the "cutter bar", permitting the student to tear the paper off and keep a printed record of the day's work.

# # #



COMPUTERIZED STUDENTS. . .Students at University Breckinridge School are studying arithmetic through a computerized program orginating with a computer in California. Dr. Howard Russell, of the Central Midwestern Regional Educational Laboratory [CEMREL], watches a student use the system. On Dr. Russell's right is Dr. Adron Doran, president of Morehead State University and on his left is Dr. Morris Norfleet, Director of Research and Program Development at Morehead.

Breckinridge Students Being Taught By Computer

Fifty-six youngsters in the University Breckinridge School last week began studying arithmetic by a new method that has overtones of the space age.

They are taking part in a computerized instruction program in arithmetic which originates at Stanford University in California and is carried across the country to their classroom by long distance telephone lines.

The program is part of a demonstration project worked out by the Central Midwestern Regional Laboratory in St. Louis, Standford University, and Morehead State University, of which University Breckinridge School is a part.

The projects is initiated under Title IV of the Federal Elementary and Secondary Education Act which provides for education research and research training. Chief Congressional sponsor of this concept has been Kentucky's Representative Carl D. Perkins, chairman of the House Education and Labor Committee.

The demonstration program at Morehead will continue until the end of the school year. But beginning in the fall, other Kentucky elementary school children are expected to take part in the program. Equipment will be installed in schools in other eastern Kentucky counties, including some one-room schools.

The classroom equipment is a teletype machine linked by telephone to a computer on the Stanford University campus in Palo Alto, Calif.

As each student takes his turn at the teletype machine, he is directed to type his name and class number. From that point on, the pre-programmed machine gives him a series of practice drills in arithmeetic. He works on one drill until he masters it, and then he moves up to another. An important aspect is that each child moves at his own speed through the lesson material and drills. At the end of the day, the machine types out for the teacher the points on which the pupil needs extra attention.

While the primary computerized material comes from Stanford, it is also possible for the Morehead program to draw upon material programmed in computers in Santa Monica, Calif., Dartmouth University and the University of Toronto.

Rep. Perkins had this to say about the program:

"The benefits of individualized learning through computer system instruction are as important for the gifted child as they are for the slow child. The gifted no longer needs to be held back at some artificial 'average' pace. The slow child need not experience the frustration of trying to 'keep up' and even the so-called 'average' child has strengths and weaknesses that can only be dealt with by individualizing instruction."

The program in eastern Kentucky is made possible because a time differential of three hours permits use of the computer during the hours before California schools using the system open for classes.

Dr. Adron Doran said, "This innovation in education plus many others to come to Eastern Kentucky is a result of cooperative effort of Morehead State University, the superintendents of the public schools involved in the Title III program, and the Central Midwestern Regional Education Laboratory."

HAROLD HOWE II, U.S. Commissioner of Education [center] looks over the computer-aided instruction laboratory at University Breckinridge School. With Howe are [left] Dr. Adron Doran, president of Morehead State University and [right] Chip Foltz, of the Applachia Advisory Committee.

Morehead 'In 21st Century' Says U.S. Education Chief

Morehead State University "has moved rapidly from the 19th century into the 21st century," according to U.S. Commissioner of Education Harold Howe II.

Commissioner Howe, speaking at the MSU Conference on Education, said the adventurous aspect of the University has led Morehead toward this progressive type of education.

He pointed out later as signs of such unusual progress, the computer teaching programs and the architecture of new buildings on campus.

Howe said federal financial aid for specific educational purposes has served to stimulate rather than stifle state and local initiative.

He cited the 50-year-old Smith-Hughes Act as an example of federal assistance that promoted educational progress which might not otherwise have been achieved. The Smith-Hughes act was designed to support vocational education through grants o states.

"This landmark program," Howe said, " . demonstrated the soundness of the principle of special federal assistance to meet a broad categorical area of national need. In recent years we have identified many other categories in which the states and local school districts can--and have--effectively used federal support."

Experience has shown, the commissioner said, that categorical aid "has stimulated local thought and action to make advances that would not have been open to the school in the absence of federal funds appropriated by Congress for this purpose."

While providing money to develop new curricula, train teachers and buy equipment, categorical aid has not led to federal control of vocational or any other kind of education, Howe pointed out.

"It has instead," he went on, "created opportunity where it was previously lacking and most needed. It has served children who would not get the benefits they are now receiving if federal money were passed out to the school without any regard to particular problems."

Those who are now urging Congress to do away with categorical aid in favor of general school assistance ignore past history and current needs, the Commissioner said. He added:

"This view . . . in effect says that education serves no national purposes, or that if it does, these purposes will somehow--perhaps by good luck and blind chance--be met by the independent unrelated decisions of 50 states, 23,000 school districts, and 2,300 colleges and universities without guidance from the Congress of the United States."

The one-day conference included a convocation in Button Auditorium, a luncheon in the Doran Student House, a tour of the computer-aided-instruction centers at University Breckinridge School and Rowan County High School and a press conference with Howe

More than 1,200 people attented the convocation and approximately 200 attended the luncheon.

From:
Central Midwestern Regional Educational Laboratory, Inc.
10646 St. Charles Rock Road
St. Ann, Missouri 63074
Harrison 9-3535

NEWS RELEASE

Fifty-six children at the Breckinridge Training School, Morehead State University, Morehead, Kentucky are taking part in a computer instructional program in arithmetic which originates at Stanford University in California and is carried across the continent by long-distance telephone lines to a teletype machine at the Kentucky school.

In a demonstration Tuesday, March 14, at the laboratory school, the children showed visitors how the program worked.

Working cooperatively in this history-making experiment in education are the Central Midwestern Regional Educational Laboratory, Inc. (CEMREL), St. Louis; Stanford University, Palo Alto, Calif., and Morehead State University.

Dr. Harry M. Sparks, State Superintendent of Public Instruction participated in planning for this project and has expressed deep interest in the continuation of developing innovations for education in Kentucky.

Dr. Patrick Suppes, director of the Institute for Mathematical Studies in the Social Sciences at Stanford, is the designer of this particular computer-assisted instruction. Coordinating the experiment for CEMREL are Dr. Henry M. Hardin, Kentucky area coordinator, and Dr. H. Howard Russell, associate director in charge of classroom teaching and learning, and for Morehead State University, Dr. Morris Norfleet, director of research for that institution.

This is how the operation works. Computer technicians at Stanford turn on their modified computer, which is loaded with specially developed arithmetic drills and practices. These are sent across country by long-distance telephone lines to Morehead to the teletype machine used by the children in the classroom. An acoustic (voice) coupler links the teletype machine to the telephone.

Tuesday's demonstration involved curriculum material developed at Stanford exclusively, but for parts of the demonstration the computer source was not that of Stanford. The large computers at Systems Development Corp. in Santa Monica, Calif., as well as a computer at Dartmouth College and the University of Toronto each in turn generated programs that were transmitted to students in Morehead, thus establishing the technical practicability of providing curriculum materials for youngsters in rural or isolated communities from well established computer resources across the country and outside the United States as well. For the balance of the experiment, which ends with the school year, the computer from Stanford will be used.

Other Kentucky elementary school children will also take part in the program when schools open in the fall. Teletype machines will be installed in some of the area's schools, including some in one-room country schools.

DRILL AND PRACTICE

In this drill and practice system, the computer instruction is strictly supplementary to the regular arithmetic class as taught by the teacher. At some time during every day, each student takes his place at the teletype for his lesson in arithmetic drill, which emphasizes the mastering of basic facts. There are five levels of difficulty at each grade level and on each arithmetic problem. Students begin at level three, and then move up or down daily on the basis of the previous day's performance. Thus, unlike drills in a traditional teaching situation, problems are selected automatically to fit individual needs.

The children adjust quickly to the machine, and the regular work of the class is not disrupted.

As each student takes his turn, the machine prints out "please type your number and first name." If the student spells his name incorrectly, he is informed "Name not listed; try again. Please type your number and name." Another incorrect spelling by the student prompts this message from the machine "Nope. Try again." When the student types his number and first name correctly, the machine responds with the child's correct last name, which the student acknowledges by hitting the space bar on the machine, and the lesson begins.

The machine is programmed to position itself to have the answer properly placed in a blank. If the student answers the problem correctly, the next problem appears. When the student answers incorrectly, the machine types out the word "Wrong. Try again," and the problem itself is repeated. A second error on the same problem is followed by the message "Wrong. The answer is_____," and the correct answer is displayed.

The problem itself is then given once more to permit the student to write in the correct answer. An error at this point by the student causes the previous message to reappear; the question is repeated, and the child fills in the correct answer. The next problem is then presented.

A time limit is set for each question. If an answer is not given in 10 seconds, the machine then goes through the routine described above, except that the words "Time is up" is substituted for "Wrong" at each step.

When the lesson is completed, the machine prints out information for each student which includes the number of correct answers, the percentage of correct answers, total errors, a list of the questions answered incorrectly and the total amount of time used. Following this information, it types "Goodbye, Charlie (or Jane or Jim). Tear off here _ _." and turns the paper up to the cutter bar,

permitting the student to tear off and keep the printed record of his day's work.

At the end of the day, or when all of the children have finished, the teacher types the word "Finished." The computer program then gives the teacher the number and the nature of the errors the children made and other information that will help her in her work.

From this information, the teacher can discuss with individual students the errors in their "print-outs" and modify her instruction to handle problems of general concern to the class.

Little teacher preparation is required. A simple dial-in code is all that is needed to call up each day's lesson. The code, consisting of 10 steps, is posted on the machine for the teacher to follow.

TAILORED INSTRUCTION

One of the most exciting aspects of using the computer is the opportunity it offers for tailoring instruction to the individual child's needs. An individual approach is possible at various levels of instruction. In the Morehead experiment, 28 second graders and 28 sixth graders are taking part.

The curriculum goal of the daily lessons supplied by the computer is to provide an organized program of review, maintenance and drill on basic skills and understanding of elementary mathematics, particularly arithmetic. Instruction in all new concepts is given initially by the teacher, who is free to select any of the prepared units in order to correlate the drill-practice work with the daily instruction. Handbooks written by Dr. Suppes and Dr. Max Jerman, his research associate, are furnished, which describe available units in detail. Also included in the handbook are reprints of every lesson.

Lessons have been prepared at each of five levels of difficulty within each unit. When a class starts a new unit, each child is given the same lesson, one of

average difficulty. Those students who score between 60% and 79% are given a level-three (average difficulty) lesson the following day; those who score above 79% are given a lesson on the next higher level (level 4), and those who fail to score at least 60% are given a simpler lesson on a lower level (level 2).

This procedure is followed throughout the unit; that is, a score of 79% branches a student up one level each day. (Of course a student could not move up beyond level 5 or down below level 1.) Thus by day three, a student could have been at any one of five levels, with a different lesson at each level.

Drills on all levels increase somewhat in difficulty from day to day within a unit as successively more advanced aspects of each topic are reviewed.

Lessons are designed to take from four to six minutes each to allow each child in the class to take one lesson each day. There are usually 20 problems.

Tomorrow's education? Authorities feel it holds great potential for improving student instruction, not only because the students confront the machine and the curriculum material one at a time, but also because the computing power of the machine can be used to assign each student to the most appropriate material to suit his individual needs.

Providing computer-assisted instruction for today's child on a nationwide basis is prohibitive costwise. Hopefully, the economics of this type of instruction are such that tomorrow's students across the nation may benefit by the work that is presently under way, not only at Morehead or Palo Alto, but at many computer centers across the United States and outside the United States as well.

This program has already been pre-tested by Dr. Suppes and his associates in a study at several California elementary schools under research supported by the U.S. Office of Education, the National Science Foundation and the Carnegie Corporation of New York.

In an effort to extend the operation and its application, the Central Midwestern Regional Educational Laboratory, Inc., through its contract with the U.S. Office of Education, is working with Dr. Suppes and Stanford University and with Morehead State University.

CEMREL, one of 20 regional educational laboratories in the United States, serves a four-state region, that of southern Illinois, Kentucky, eastern Missouri and central and western Tennessee. Its function is to improve education and to shorten the amount of time between educational research and discovery and its application in the public and private classrooms of the region. Dr. Wade M. Robinson is CEMREL's executive director.

MOREHEAD STATE UNIVERSITY
MOREHEAD, KENTUCKY

MOREHEAD, Ky. --Three Meadville area elementary teachers have completed a one-week course in Computer-Assisted Instruction at Morehead State University. They are Inez Jordan and Larkell Bramlett of Summitt, and Lorene Brandon and K. C. Butcher, McComb.

In the pilot project at Morehead, students working at type keyboards perform drills sent them from a computer located at Stanford University, Palo Alto, Calif.

Objectives of the workshop were to teach ways the mathematical drills on the machines can assist, enrich and supplement regular teaching; to develop an understanding of CAI - the effect on the teacher, student, parents and community; to project future trends and possibilities of CAI.

When U. S. Education Commissioner Harold Howe II visited the Morehead campus during the workshop, he spoke of CAI as one step in a progressive program which takes education directly from the 19 to the 21st Century.

Computer-Assisted Instruction is a cooperative program between Stanford University, Morehead and the Central Midwestern Regional Educational Laboratory of St. Louis.

Schools in the McComb area are planning to install CAI this year.

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degree in industrial management.

He joined General of Ohio in 1958 and held various positions in General's accounting department after completing the company's supervisory training program.

TPA Elects Gorman President, Names Association V.P.'s

Paul A. Gorman, president of Western Electric Co., has been elected president of the Telephone Pioneers of America (TPA) for the 1967-68 year, beginning July 1.

TPA is the largest social-industrial organization in the world. Today, membership totals 262,000. The accelerated growth in new members anticipated for several years has begun. Some 30,000 telephone men and women are expected to join in the current year, three times the number admitted in 1965-66. The dramatic influx results from the large number of employes who entered the industry after World War II and are now reaching 21 years of service.

Allen G. Barry, president of New England Telephone & Telegraph Co., was elected senior vice president, also for a one-year term.

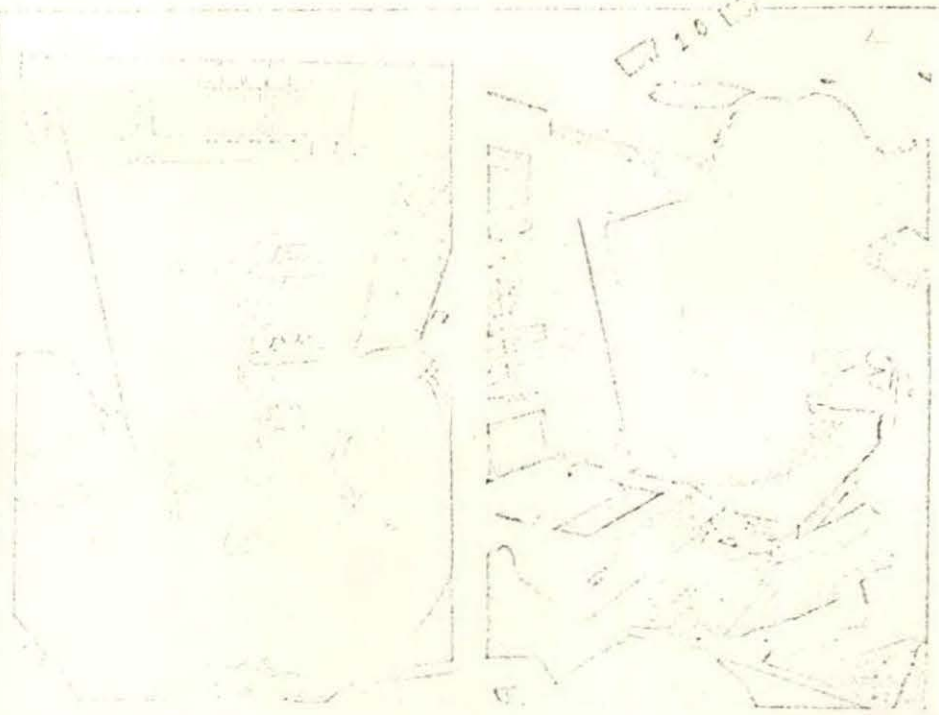
Elected association vice presidents for two-year terms, beginning July1, are: George V. Leftwich, San Francisco, Cal., Region 2; Stanley A. Youngblut, Denver, Col., Region 3; Daniel A. Moore, Chicago, Ill., Region 5; Frank K. Drake, Cleveland, Ohio, Region 6; U. G. Hodgin, Harrisburg, Pa., Region 9; and A. C. Dickieson, Holmdel, N.J., Region 10.

Six previously elected vice presidents will continue in office for another year. They are: Harry C. Smith, Toronto, Canada, Region 1; Sam E. Holcomb, Dallas, Tex., Region 4; Robert J. Clontz, Charlotte, N.C., Region 7; William B. Brennan, Richmond, Va., Region 8; Peter J. O'Brien, Albany N.Y., Region 11; and Warren V. Allen, Boston, Mass., Region 12.

Transmit Computer Math Lessons to Kentucky Students

Elementary students at the Breckenridge School, which is operated as part of Morehead State University, in Morehead, Ky., recently began receiving instructions in arithmetic from a computer at Stanford University in California over long-distance data communications facilities.

Transmission of educational data over conventional telephone lines to teletypewriters at the Kentucky school enabled more than 50 second and sixth grade students to utilize a highly advanced teaching program in basic mathematics prepared at Stanford University for its computation center.



David H. McMullan, data communications consultant for General Telephone of California, and Sue McGregor, computer operator for Systems Development Corp., await a long-distance telephone call, at left, from the Breckenridge School. The call was answered automatically by one of the data sets on the equipment rack, which provided access to the Santa Monica computer. Jan Murphy (at right), assistant computer operator for Systems Development, monitors the computer system's teletypewriter unit as Kentucky students respond to questions from the computer.

During the formal inauguration of the program, similar arithmetic lessons were relayed to the Breckenridge students from computers at Systems Development Corp. in Santa Monica, Cal. and the University of Toronto in Canada.

The supplemental Santa Monica and Toronto computers were utilized in order to demonstrate the feasibility of transmission of advanced teaching data from diverse computer centers thousands of miles away. The data communications equipment and circuits at Systems Development Corp. were installed by General Telephone Company of California, a telephone operating subsidiary of GT&E.

Individual Instruction

The students sat in turn at one of three teletypewriter units which typed the arithmetic lesson for each individual as it was received over conventional telephone lines.

As each student took his or her turn, the teletypewriter printed out "please type your class number and first name." If the student spelled his name incorrectly, he was notified by the computer-controlled machine "name not listed, try again. Please type your number and name." Another incorrect spelling by the student prompted this message: "nope, try again."

When the student typed his class number and first name correctly, the teletypewriter responded with the child's correct last name. The student acknowledged its receipt by hitting the "space bar," and the lesson began.

"Wrong, Try Again"

The Stanford computer is programmed to respond when a student's answer is properly placed in a pre-determined blank space. If the student answers the problem correctly, the next problem appears. When the student answers incorrectly, the teletypewriter types out the words "wrong, try again," and the problem itself is repeated. A second error on the same problem is followed by the message "wrong, the answer is . . . ," and the correct answer is displayed.

The problem itself is then given once more to permit the student to write in the correct answer. An error at this point by the student causes the previous message to reappear; the question is repeated, and the child fills in the correct answer. The next problem is then presented. A 10-second time limit is set for each question.

When the lesson is completed, the teletypewriter prints out information for each student, including the number of correct answers, the percentage of correct answers, total errors, a list of the questions answered incorrectly, and the total amount of time consumed.

The number of problems for each student was determined on the basis of the child's scholastic progress, requiring an average of about five minutes at

the teletypewriter. Access to the distant computers was accomplished through conventional long-distance telephone calls to the various computer centers by the teachers at Breckenridge.

CEMREL Supports Program

Prof. Morris Norfleet, director of research and development at Morehead State, is the university's coordinator for the program, which is receiving financial support from the Central Midwestern Regional Educational Laboratory, Inc. (CEMREL).

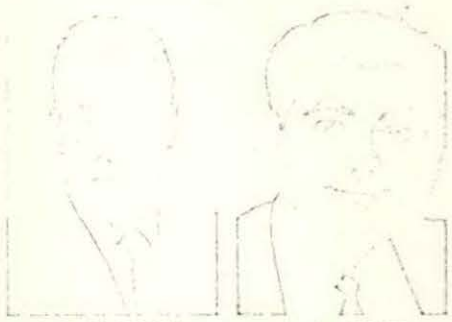
Dr. Howard Russell, associate director at CEMREL, said the data communications program "offers the one-room school in rural Kentucky the benefit of sophisticated programming resources in a highly specialized curriculum which is equal to the most advanced available in urban centers anywhere in the world."

ITT Telecommunications Div. Elects Four Vice Presidents

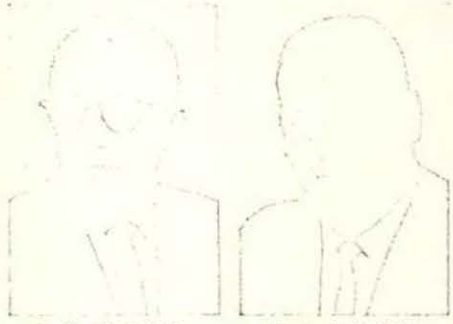
Four vice presidents for the ITT Telecommunications Division of International Telephone & Telegraph Corp., have been elected recently. The new vice presidents are James H. McGarry Sr., general manager of the division's transmission department in Raleigh, N.C.; George E. Safiol, general manager of the Apparatus department in Corinth, Miss.; Donald R. Lehrman who was also named director of marketing programs for the division, and Stanley J. Rejniak who was named general sales manager for the division.

Mr. McGarry joined ITT in 1949, and has an extensive background in operations management. He attended Illinois Institute of Technology and the University of Maryland, and is a member of the Research Institute of America, Society for Advancement of Management and the American Management Association.

Mr. Safiol joined the ITT System in 1957, with the Federal Electric Corp. subsidiary, where he served as manager of facilities engineering and construction. In 1960, he was assigned to administer the design and construction of ITT World Headquarters Building in New York City. In 1962, he became vice president and manager of operations for the ITT Airmatic Systems Corp., and was named staff assistant to the president of ITT Telecommunications in 1964. In 1966, he was made director of manufacturing, switching department of ITT Telecommunications.



J. H. McGARRY G. E. SAFIOL



D. R. LEHRMAN S. J. REJNIAK

Mr. Safiol was graduated from New York University in 1954 with a B.S. degree in Civil Engineering, and attended NYU and Columbia University graduate schools.

Mr. Lehrman, who will be responsible for the development of nationwide marketing programs for ITT Telecommunications has more than 20 years experience in the telephone industry, and was director of government and industrial sales for ITT Telecommunications.

From 1957 to 1961, Mr. Lehrman was with ITT Kellogg (now ITT Telecommunications) where he held a number of posts including staff engineer; manager, special systems department; supervisor SAGE engineering group, and application engineer. Prior to joining ITT, he spent 12 years with the Illinois Bell Telephone Co.

Mr. Lehrman attended Illinois Institute of Technology, Northwestern University, The University of Chicago, Bell System schools and courses given by the American Management Association. He is a member of the Institute of Electrical & Electronics Engineers.

Mr. Rejniak joined the ITT Telecommunications division after 10 years with ITT Terryphone where he held a number of sales management positions; his most recent post was vice president of marketing. From 1951-1956, he was associated with Burroughs Corporation in the sales field.

We Are Too Close

Experience does not err; it is only your judgment that errs in expecting from her what is not in her power. —Leonardo da Vinci.

Pruzan Co. To Bring Special Service to 3 Western States

The Pruzan Company has announced that a second Field Showroom, a mobile unit which features new products and new applications for existing products, has been acquired to serve the telephone, power and CATV industries in California, Nevada and Arizona.

The first Pruzan Field Showroom was introduced last year and proved to be very popular. The company plans to bring this service to other areas in the future.

With this service, customers are able to discuss their problems directly with an expert in the field and personally